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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant	: Robert Parker	Art Unit	: 2631
Serial No.	: 09/364,241	Examiner	: Khanh C. Tran
Filed	: July 29, 1999		
Title	: OSCILLATOR CONTROLLING		

Mail Stop Appeal Brief - Patents
Hon. Commissioner for Patents
P.O. Box 1450
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APPEAL BRIEF

(i) REAL PARTY IN INTEREST.

Bose Corporation.

(ii) RELATED APPEALS AND INTERFERENCES.

None.

(iii) STATUS OF CLAIMS.

In the office action dated March 24, 2004, maintained in the final office action dated January 24, 2005, claims 1 and 4-13 being appealed stood rejected under 35 U.S.C.§103(a) as being unpatentable over Imazeki, and claims 2, 3, 14 and 15 being appealed stood rejected under 35 U.S.C.§103(a) as being unpatentable over Imai.

(iv) STATUS OF AMENDMENTS.

No amendments were filed subsequent to final rejection.

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(v) SUMMARY OF CLAIMED SUBJECT MATTER.

The invention relates to tuning the oscillator of a receiver so that its frequency is always within the band of received frequencies and cannot radiate outside this band. The invention includes tuning an oscillator, such as local oscillator 26, of a receiver, such as 10, including receiving an electromagnetic signal having a frequency within a predetermined range of reception frequencies, such as with antenna 16, within the range of frequencies from 2400MHz to 2485MHz, comparing the frequency of the desired received signal to a threshold frequency, such as with frequency comparator 18, and tuning the oscillator of the receiver to a frequency within the range of reception frequencies based on the threshold frequency that is less and more than the received frequency when the received frequency is above and below the threshold frequency, respectively. Page 2, lines 14-26, page 4, line 15, page 6, line 9. The desired received signal frequency may be converted to an index value of a set of index values, the set of index values corresponding to a set of channels in the predetermined range of reception frequencies. Page 2, line 32-page 3, line 1. The threshold frequency may be represented as an index value of a set of index values, the set of index values uniquely corresponding to a set of channels in the predetermined range of reception frequencies. Page 3, lines 1-2. Tuning the oscillator may comprise applying one of at least two frequency offsets, such as with offset circuitry 22, to the received frequency that is subtracted and added when the received frequency is greater than and less than the threshold frequency, respectively. Page 3, lines 3-7. The first and second offsets may have the same magnitude. Page 3, lines 7-9. The range of frequencies may be bounded by high and low frequencies F_{HIGH} and F_{LOW}, respectively, with the first and second offsets being less than or equal to $(F_{HIGH} - F_{LOW})/2$. Page 3, lines 7-9. The first and second frequency offsets may be equal to an intermediate frequency of the receiver. Page 3, lines 7-9.

An electromagnetic signal receiver, such as 10, is constructed and arranged to receive signals within a predetermined frequency range, such as 2400MHz-2485MHz, and having a predetermined intermediate frequency, such as 40MHz and has a local oscillator such as 26, a source of a signal representative of the frequency of a desired signal to be received within the predetermined frequency range, such as antenna 16, a frequency controller, such as 40 (FIG. 2B), coupled to the local oscillator and the source of a signal for providing a frequency control signal

to the local oscillator that always sets the frequency of the local oscillator to a frequency that differs from the frequency of the desired signal by the intermediate frequency and is within the predetermined frequency range. The receiver may include a signal path, such as 12, for conducting a received electrical signal of reception frequency within the predetermined range of frequencies and a mixer, such as 36, coupled to the local oscillator and the signal path for providing the intermediate frequency signal of predetermined intermediate frequency. The local oscillator may further comprise a phase locked loop, such as 23, the frequency controller may comprise a microprocessor, such as 60, that may comprise a computer readable medium containing instructions capable of causing the frequency controller to subtract a first frequency offset value when the received frequency is greater than a predetermined threshold frequency within the predetermined frequency range and add a second frequency offset value of magnitude to the local oscillator frequency corresponding to the intermediate frequency when the received frequency is less than the threshold frequency. Page 4, line 15-page 6, line 30-page 7, line 25-page 9, line 29.

(vi) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL.

1. The rejection of claims 1 and 4-13 under 35 U.S.C.§103(a) as being unpatentable over Imazeki.

2. The rejection of claims 2, 3, 14 and 15 under 35 U.S.C.§103(a) as being unpatentable over Imai.

(vii) ARGUMENT.

I. NOTHING IN IMAZEKI SUGGESTS THE DESIRABILITY OF MODIFYING WHAT IS THERE DISCLOSED TO MEET THE TERMS OF REJECTED CLAIMS 1 AND 4-13 REQUIRING THAT THE RECEIVER OSCILLATOR FREQUENCY ALWAYS BE WITHIN THE RECEIVED FREQUENCY BAND BY CONTROLLING THIS FREQUENCY TO BE LESS AND MORE THAN THE RECEIVED FREQUENCY WHEN THE RECEIVED FREQUENCY IS ABOVE AND BELOW THE THRESHOLD FREQUENCY, RESPECTIVELY.

The final rejection states:

> Claims 1 and 4-13 are rejected under 35 U.S.C. 103(a) as being unpatentable . over Imazeki U.S. Patent 4, 245, 348.
>
> Regarding claim 1, Imazeki invention is directed to radio frequency receiver comprising circuit means for tuning the receiver to a plurality of frequencies within a range of frequencies which includes the selected signal and for producing an intermediate frequency signal corresponding to the frequency to which the receiver is tuned.
>
> In column 3 lines 13-37, figure 1 illustrates a RF receiver receives an RF signal having a frequency within a range of frequencies. Imazeki further states that the frequency range may include frequencies from different designated frequency bands (e.g. VHF and UHF) to which it is desired to tune the receiver.
>
> In column 3 lines 37-68, the RF receiver in figure 1 further includes a frequency discriminator means in the form of an audio detector 20 coupled to IF amplifier 18. The frequency discriminator is responsive the received intermediate frequency (IF) signal for developing an output signal which has a DC component directly proportional to the deviation of the IF frequency from the predetermined frequency. In column 4, lines 49-68, in accordance to one aspect of the invention, the RF receiver in figure 1 further includes a detecting means in the form of center frequency detector 30 coupled to the audio detector 20 and responsive to the DC component, developed by an audio detector 20, for developing a gating signal. The gating signal has a first value when the DC component is between pre-selected upper and lower threshold values and has a second value when the DC component is not between the upper and lower threshold values. Imazeki further states that by selecting the upper and lower threshold values very close to each other in accordance with features of the invention, the receiver in figure 1 may be set to enable audio signal reproduction only when the receiver is tuned to or very close to the center frequency of the received signal. In light of the foregoing teachings, the step of selecting the upper and lower threshold values very close to each other forms an equivalent threshold value representative of the center frequency of a received frequency. Figure 3 illustrates the implementation of the center frequency detector 30 including a pair of voltage comparators 31 and 32 for setting the upper and lower threshold values.
>
> Imazeki teachings do not expressly disclose the step of comparing the frequency of the desired received signal to a threshold frequency. Nevertheless, as recited above, the step of selecting the upper and lower threshold values very close to each other forms an equivalent threshold value representative of the center frequency of a received frequency. In column 6 lines 51-68, the DC component is applied to comparators 31 and 32, which produce a "low" output if the DC signal is more or less the equivalent threshold value and a "high" output if the DC signal is very close to or at the equivalent threshold value. It would have been obvious for one of ordinary skill in the art at the time the invention was made that comparators 31 and 32 perform the step of comparing the DC component, which is representative of the frequency of a received signal, with the

threshold value, which is formed by selecting the upper and lower threshold values very close to each other and represents the center frequency. It is not necessary to state a motivation since comparator, as well known in the art, perform the comparing step.

In column 5 lines 19-48, a scanner circuitry 40 in figure 2, provided between the switching circuit 23 (which is responsive to the signal developed by center frequency detector 30) and local oscillator 17, causes the variable tuning means to automatically and sequentially tune the receiver to the desired frequency which is the center frequency and stop when the scanner circuitry 40. The variable tuning means as taught by Imazeki includes the local oscillator 17 which as known in the art is utilized to tune to a frequency and produce a corresponding intermediate frequency signal. Hence, it would have been obvious for one of ordinary skill in the art at the time the invention was made that the variable tuning means causes the local oscillator 17 to tune to a frequency within the range of reception frequencies based on the comparison between the DC component and a threshold value (representative of a desired center frequency). The threshold value is more or less than the DC component, which is representative of the received frequency. Again, it is not necessary to state a motivation since the local oscillator 17 performs the tuning process.

Regarding claim 4, as recited in claim 1, comparators 31 and 32 compare the DC component with the equivalent threshold value, formed by selecting the upper and lower threshold values very close to each other, to produce a "low" output when the DC component is more or less than the threshold, and a "high" output when the DC component is at or very close than the threshold. In the case of "low" output, a scanning means in the form of scanner circuitry 40 causes the variable tuning means to automatically and sequentially tune the local oscillator to the desired frequency. Imazeki does not expressly disclose applying one of at least frequency offsets to the received frequency as claimed in the patent application. However, since adjusting the received frequency close to a desired frequency requires adding or subtracting a frequency offset value, one of ordinary skill in the art will appreciate that scanner circuitry applies a frequency offset to add or subtract to the received frequency based on results from the comparison between DC component and the threshold value. Hence, there are at least two frequency offsets for adding and subtracting in light of the aforementioned reasoning.

Regarding claim 5, the threshold value is representative of the center frequency of a desired frequency. One of ordinary skill in the art will appreciate that there are numerous cases that both frequency offsets have the same magnitude, e.g. received frequency at either end of frequency range. Regarding claim 6, a range of frequencies is inherently bounded by high and low frequency values, defined by FHIGH and F10 , respectively. Since a threshold value in Imazeki invention is representative of center frequency, one of ordinary skill in the art will appreciate that mathematically, the first offset and second offset are equal or less than (FHIGH - Flow) / 2.

Regarding claim 7, since there is no specific range of frequencies in the claim, one of ordinary skill in the art will appreciate that the first and second frequency offsets are inherently equal to an intermediate frequency of the receiver.

Regarding claim 8, said claim is rejected using similar argument as in claim 1 because both claims have similar scope. Furthermore, the claimed threshold frequency is the center frequency, which is taught in Imazeki invention.

Regarding claim 9, said claim is rejected using similar argument as in claim 1 because both claims have similar scope. Furthermore, in column 3 lines 18-32, Imazeki invention applies to frequency bands such as VHF and UHF. The range of frequencies as claimed in the patent application is within UHF band that covers from 2300 MHz to 2900 Mhz. Regarding claims 10-11, referring back to figure 2, an RF receiver includes a local oscillator 17, an antenna 12 for receiving an RF signal within a predetermined range of frequencies, an audio detector 20, detecting means in the form of a center frequency detector 30.

Imazeki does not expressly disclose a source of signal representative of the frequency of a desired signal, and a frequency controller for providing a frequency control signal as claimed in the patent application. However, Imazeki discloses center frequency detector 30 including a pair of voltage comparators 31 32 that are set by potentiometers 35 36. Since potentiometers 35 36 are adjusted to a pre-selected voltage output representative of center frequency of a desired signal, it would have been obvious for one of ordinary skill in the art at the time the invention was made that potentiometers 35 36 are the source of signal representative of the frequency of a desired signal.

In column 6 lines 1-25, detecting means coupled to local oscillator 17 through the scanner circuitry 40 and potentiometers 35 36 develops a control signal in responsive to a DC signal component developed by detector 20. The control signal controls scanning means in the form of a scanner circuitry 40 through switching means in the form of switching circuit 23 for stopping the scanning only when the control signal has a value corresponding to the receiver being tuned to the frequency of a desired signal. Scanner circuitry 40 causes the local oscillator 17 to tune the receiver to a desired frequency. Hence, one of ordinary skill in the art will appreciate that detecting means is equivalent to a frequency controller as claimed in the patent application to due to similar functionalities. Furthermore, a mixer and filter 16 always sets the frequency of the local oscillator 17 to a frequency that differs from the frequency of a desired signal by an IF frequency and is within the predetermined range of frequencies.

Regarding claim 12, in column 5 lines 19-48, Imazeki discloses the scanner receiver embodiment in figure 2 including variable tuning means to selectively and sequentially tune the receiver to the predetermined frequencies and produce a corresponding IF signal. Imazeki states that several known techniques for implementing variable tuning means including programmable frequency synthesizer circuits for the local oscillator to tune the receiver to the

desired frequencies. Imazeki discloses in the background of the invention that a synthesized frequency generating circuit sometimes takes the form of a phase-locked loop circuitry. Hence, one of ordinary skill in the art will appreciate that a phase-locked loop could be implemented in the local oscillator as claimed in the patent application.

Regarding claim 13, the scope of said claim is similar to that of claims 10-11. Rejection arguments of claims 10-11 also apply here. Furthermore, in column 3 lines 18-32, Imazeki invention applies to frequency bands such as VHF and UHF. The range of frequencies as claimed in the patent application is within UHF band that covers from 2300 MHz to 2900 Mhz. Pp.16-22.

These grounds of rejection are respectfully traversed.

"The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification." *In re Gordon,* 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984).

And in *In re Kotzab*, 55 U.S.P.Q.2d 1313, 1316 (Fed. Cir. 2000), the Court said:

> [I]dentification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. See id. [Dembiczak]. Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant. See *In re Dance*, 160 F.3d 1339, 1343, 48 U.S.P.Q.2d 1635, 1637 (Fed. Cir. 1998), *In re Gordon*, 733 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984). Even when obviousness is based on a single prior art reference, there must be a showing of a suggestion or motivation to modify the teachings of that reference. See *B. F. Goodrich Co. v. Aircraft Braking Sys. Corp.*, 72 F.3d 1577, 1582, 37 U.S.P.Q.2d 1314, 1318 (Fed. Cir. 1996).

Nothing in the reference remotely suggests the desirability of modifying what is there disclosed to meet the terms of the rejected claims.

The reference does not disclose "comparing the frequency of the desired received signal to a threshold frequency" as called for by all the rejected claims. Nor does the reference suggest the desirability of comparing the frequency of the desired received signal to a nonexistent threshold frequency. Nor does the reference disclose tuning the oscillator of the receiver to a frequency within the range of reception frequencies based on the nonexistent threshold

frequency, that is less and more than the received frequency when the received frequency is above and below the nonexistent threshold frequency, respectively, as called for by claims. Nor does the reference suggest the desirability of modifying what is there disclosed to tune the oscillator of the receiver to a frequency within the range of reception frequencies based on the threshold frequency, that is less and more than the received frequency when the received frequency is above and below the nonexistent threshold frequency, respectfully.

While the standard FM reception band is from 88 to 108MHZ, there is no disclosure in the reference that local oscillator 17 has a frequency always within 88-108MHZ, let alone that is less and more than the received frequency in that band when the received frequency is above and below the undisclosed threshold frequency, respectively, nor suggestion of its desirability.

As to the additional basis for rejecting claim 4, the reference does not disclose any information on tuning local oscillator 17, let alone applying one of at least two frequency offsets to the received frequency that is subtracted and added when the received frequency is greater than and less than the threshold frequency, respectively, nor remotely suggest the desirability of modifying what is there disclosed to include this added limitation.

As to the additional basis for rejecting claim 5, there is not the slightest suggestion of providing the nonexistent first and second offsets as having the same magnitude.

Regarding the additional grounds for rejecting claim 6, the reference does not disclose anything relating to first and second offsets being less than or equal to $(F_{HIGH} - F_{LOW})/2$, or suggest the desirability of modifying anything there disclosed to meet this additional limitation in claim 6.

As to the additional limitation added by claim 7, the reference does not disclose that the first and second nonexistent frequency offsets are equal to an intermediate frequency of the receiver or suggest the desirability of modifying what is there disclosed to meet this added limitation.

As to the rejection of claim 8, the reasoning set forth above in support of the patentability of claim 1 is submitted to support the patentability of claim 8. The reference does not disclose the center frequency as a threshold frequency. The reference discloses the center frequency is that of the received signal (column 4, lines 65-68), which will dynamically change when the received signal changes as the user tunes to different stations. That is not the threshold

frequency of the invention disclosed and claimed in this application. Nor does the reference disclose comparing the frequency of the desired received signal to the nonexistent threshold frequency and tuning the oscillator of the receiver to a frequency within the range of reception frequencies based on the threshold frequency, that is less and more than the received frequency when the received frequency is above and below the threshold frequency, respectively, wherein the range of frequencies is bounded by high and low frequencies F_{HIGH}, F_{LOW} respectively, the threshold frequency approximately equaling $F_{LOW} + (F_{HIGH} - F_{LOW})/2$, nor is there the slightest suggestion in the reference for modifying what is there disclosed to meet the limitations of this claim.

As to the rejection of claim 9, the reasoning set forth above in support of the patentability of claims 1 and 8 is submitted to support the patentability of claim 9, and nothing in the reference suggests the desirability of modifying what is there disclosed to meet the terms of claim 9, including that the range of frequencies is 2400MHz to 2485MHz inclusive. That range of frequencies is not specifically disclosed in the reference or the desirability of choosing that range.

Regarding claims 10 and 11, these claims call for the frequency controller being coupled to the local oscillator and the signal input for providing a frequency control signal to the local oscillator that always sets the frequency of the local oscillator to a frequency that differs from the frequency of the desired signal by the intermediate frequency and is within the predetermined frequency range. Nothing in the reference remotely discloses this limitation nor the desirability of modifying what is there disclosed to meet this limitation.

As to the additional grounds for rejecting claim 12, claim 12 is dependant upon and includes all the limitation of claim 11 so that further discussion is submitted to be unnecessary.

As to the rejection of claim 13, the reference fails to disclose a frequency controller coupled to the local oscillator and the signal path for providing a frequency control signal to the local oscillator that always sets the frequency of the local oscillator to a frequency that differs from that of a received signal within the predetermined frequency range by the intermediate frequency and is within the predetermined frequency range, nor does the reference suggest the desirability of modifying what is there disclosed to meet these limitations. Nor does the

reference disclose modifying what is there disclosed to choose the predetermined frequency range as between 2440MHz to 2485MHz.

If this ground of rejection was repeated, the Examiner was respectfully requested to quote verbatim the language in the reference regarded as corresponding to each limitation in these rejected claims, and quote verbatim the language in the reference regarded as suggesting the desirability of modifying what is there disclosed to meet the limitations of these claims absent from the reference. The Examiner did not and could not comply with this request. Instead of quoting the language in the reference regarded as suggesting the desirability of modifying what is there disclosed which he concedes does not meet the limitations of any of the rejected claims, the final action states:

> 3. Applicant's arguments filed on 09/24/2004 have been fully considered but they are not persuasive. The following response addresses Applicant's arguments in the Remarks:
>
> Before responding to Applicant's arguments, referring back to Imazeki invention, as recited in the last Office action, Imazeki invention is directed to radio frequency receiver comprising circuit means for developing a gating signal when a radio-frequency signal receiver is tuned to the center-frequency of a selected radio-frequency signal.
>
> As discussed in the Background of the Invention, it is well known that when an AM or FM receiver, for example, is tuned to a frequency somewhat removed from the center frequency of the selected station or channel, a significant amount of undesired noise is present in an audio output of the receiver. As the receiver is tuned to frequencies closer to the center frequency, the audio output becomes less noisy until the optimum is attained at or very near the center frequency; see column 1, lines 5-20.
>
> lmazeki further discusses problems in a conventional scanning circuit that it is extremely difficult to adjust such a circuit so that it stops the scanning operation when a preset level of signal strength to provide optimum tuning (e.g. center-frequency) for all signals of interest: see column 1, lines 44-65. The scanning receiver taught in Imazeki invention is controlled to tune to each of desired frequency and stop when it has tuned to the center frequency of a received frequency (a selected station or channel); see column 5, lines 19-50.
>
> To implement the teachings, a center frequency detector 30 as shown in figure 3 employs a pair of voltage comparators 31 32 and an AND gate signal. The pair of voltage comparators 31 32 is to set up a range of frequency threshold for determining if the receiver tunes close to the center frequency with an acceptable signal level. lmazeki further expresses that the predetermined range can be very narrow, thus corresponding to the center frequency of the received signal; see column 6, line 57-68.

Contrary to the Applicant's arguments that "the reference does not disclose comparing the frequency of the desired received signal to a threshold frequency as called for by all the rejected claims. Nor does the reference suggest the desirability of comparing the frequency of the desired received signal to a nonexistent threshold frequency", as recited in the last Office action, the comparators 31 32 perform the comparison step. The comparators 31 32 taught by Imazeki compares the frequency of the received signal through an FM audio detector 20 to a threshold frequency, which is the center frequency of the received signal.

Contrary to the Applicant's arguments that "Nor does the reference disclose tuning the oscillator of the receiver to a frequency within the range of reception frequencies based on the nonexistent threshold frequency that is less or more than the received frequency when the received frequency is above and below the nonexistent threshold frequency, respectively as called for by claims. Nor does the reference suggest the desirability of modifying what is there disclosed to tune the oscillator of the receiver to a frequency within the range of reception frequencies based on the threshold frequency, that is less or more than the received frequency when the received frequency is above and below the threshold center frequency", as recited in the last Office action, in column 5 lines 19-67, the scanner circuitry 40 as shown in figure 2, provided between the switching circuit 23 (responsive to the signal developed by center frequency detector 30) and local oscillator 17, causes the variable tuning means to automatically and sequentially tune the receiver to the desired frequency which is the center frequency and stop when the scanner circuitry 40 tunes to the center frequency of a received frequency, the center frequency corresponding to the claimed threshold frequency. The variable tuning means as taught by Imazeki includes the local oscillator 17 which as known in the art is utilized to tune to a frequency and produce a corresponding intermediate frequency signal. Furthermore, a person of average skill in the art would recognize that by tuning the receiver to the center frequency of a received signal (center frequency of the selected station or channel), the scanner circuitry 40 inherently tunes the oscilloscope 17 of the receiver shown in figure 2 to the frequency within the range of reception frequencies based on the threshold center frequency, that is less or more than the received frequency when the received frequency is above and below the threshold center frequency.

Imazeki invention differs from the instant application in that Imazeki teachings tune the receiver to the center frequency of a received signal; the center frequency is the center frequency of the selected station or channel. The instant application calls for tuning a local oscillator of a receiver to a frequency with a frequency range based on a threshold center frequency of said frequency range. Nevertheless, since the receiver as taught by Imazeki tunes to the center frequency of a selected station or channel, it would have been obvious for one of ordinary skill in the art at the time the invention was made that "tuning to the center frequency of a selected station or channel" should correspond to "tuning to

a frequency within a frequency range based on a threshold center frequency of said frequency range" as claimed in the instant application.

Regarding to the Applicant's arguments that "while the standard FM reception band is from 88 to 108MHz, there is no disclosure that local oscillator 17 has a frequency always within 88-108Mhz, let alone that is less and more than the received frequency in that band when the received frequency is above and below the undisclosed threshold frequency".

As recited above, Imazeki teachings are an improved system over conventional AM or FM receiver. As well known in the art, any signal can be frequency modulated or amplitude modulated in a frequency range. Imazeki teachings apply to frequency ranges including VHF and UHF (see column 3, lines 25-30), both ranges cover from 30 MHz to 3000 MHz: The range of 88-108Mhz is the entire range of FM reception. Imazeki receiver is tuned to the center frequency of a selected station or channel. In light of the foregoing discussion, a person of average skill in the art will recognize that local oscillator 17 is designed to be able to tuning to any frequency covered by the teachings.

In response to Applicant's argument that "to the additional basis for rejecting claim 4, the reference does not disclose any information on tuning local oscillator 17, let alone applying one of at least two frequency offsets to the received frequency that is added when the received frequency is greater than and less than the threshold frequency, respectively, nor remotely suggest the desirability of modifying what is there disclosed to include this added limitation". Contrary to Applicant' arguments, in column 5, lines 30-50, in the embodiment of the invention illustrated in figure 2, scanning means in the form of scanner circuitry 40 and local oscillator 17 for causing the variable tuning means to automatically and sequentially tune the receiver to each of the desired frequencies and stop when it has tuned to the center frequency of a received frequency. As recited in the last Office action, Imazeki does not expressly disclose applying one of at least frequency offsets to the received frequency as claimed in the patent application. However, since adjusting the received frequency close to the center frequency requires adding or subtracting a frequency offset value, one of ordinary skill in the art would.have recognized that scanner circuitry applies a frequency offset to add or subtract to the received frequency based on results from the comparison between DC component and the threshold value. Hence, there are at least two frequency offsets for adding and subtracting in light of the aforementioned reasoning.

In response to Applicant's argument that "as to the additional basis for rejecting claim 5, there is not the slightest suggestion of providing the nonexistent first and second offsets as having the same magnitude". This is the case when the frequency of the received signal is at either end of the frequency range of a selected channel. In view of that, magnitudes of the frequency offsets on either end have the same magnitude in order to tune the received signal to the center frequency.

In response to Applicant's argument that "regarding the additional grounds for rejecting claim 6, the reference does not disclose anything relating to first and second offsets being less than or equal to (FH/GH + -FLOW)/2, or suggest the desirability of modifying anything there disclosed to meet this additional limitation in claim 6". As recited in the last Office action, a range of frequencies of a selected station or channel is inherently bounded by high and low frequency values, defined by FHIGH and Flow respectively. Since a threshold value in Imazeki invention is representative of center frequency, one of ordinary skill in the art will appreciate that mathematically, the first offset and second offset are equal or less than (FHIGH - FLAW) / 2. In light of the foregoing discussion, it is not necessary to modify Imazeki teachings to meet the claimed limitations.

In response to Applicant's argument that "as to the additional limitation added by claim 7, the reference does not disclose that the first and second nonexistent frequency offsets are equal to an intermediate frequency of the receiver or suggest the desirability of modifying what is there disclosed to meet this added limitation", referring to figure 2,

also in column 5, lines 19-50, the scanning receiver comprises variable tuning means in the form of antenna 12, RF amplifier 14, mixer and filter circuitry 16, local oscillator 17, and IF amplifier 18 to selectively and sequentially tune the receiver to the predetermined frequencies and produce a corresponding intermediate frequency signal. Because local oscillator 17 tunes the receiver to the predetermined frequencies and produce a corresponding intermediate frequency signal, it would have been obvious for one of ordinary skill in the art at the time the invention was made that the frequency offsets are equal to the intermediate frequency of the receiver.

reasoning set forth above in support of the patentability of claim 1 is submitted to support the patentability of claim 8. The reference does not disclose the center frequency as a threshold frequency. The reference discloses the center frequency is that of the received signal (column 4, lines.65-68), which will dynamically change when the received signal changes as the user tunes to different stations. That is not the threshold frequency of the invention disclosed and claimed in this application. Nor does the reference disclose comparing the frequency of the desired received signal to the nonexistent threshold frequency and tuning the oscillator of the receiver to a frequency within the range of reception frequencies based on the threshold frequency, that is less and more than the received frequency when the received frequency is above and below the threshold frequency, respectively, wherein the range of frequencies is bounded by high and low frequencies FHIGH, FLOW respectively, the threshold frequency approximately equaling FLOW + (FHIGH - FLOW)/2, nor is there the slightest suggestion in the reference for modifying what is there disclosed to meet the limitations of this claim". The claim calls for "tuning the oscilloscope of the receiver to a frequency within the range of reception frequencies based on the threshold frequency...". Imazeki teachings tune the scanning receiver to the center of a received frequency signal, corresponding to a selected channel or station. In

view of that, the teachings address the claimed limitations. As stated in the last Office action, claim 8 is rejected on the same ground as for claim 1 because of similar scope. Furthermore, in column 6, lines 32-67, the upper and lower threshold values are chosen to be very narrow, thus corresponding to the center frequency of the received signal (selected station or channel). In view of that the center frequency of a desired frequency range is equivalent to the claimed threshold frequency.

In response to Applicant's arguments that "as to the rejection of claim 9, the reasoning set forth above in support of the patentability of claims I and 8 is submitted to support the patentability of claim 9, and nothing in the reference suggest the desirability of modifying what is there disclosed to meet the terms of claim 9, including that the range of frequencies is 2400MHz to 2485MHz inclusive. That range of frequencies is not specifically disclosed in the reference or the desirability of choosing that range". As stated in the last Office action, claim 9 is rejected on the same ground as for claim 1 because of similar scope. Imazeki expresses the teachings apply to frequency ranges including VHF and UHF (see column 3, lines 25-30), both ranges cover from 30 MHz to 3000 MHz. The range of frequencies as claimed in the patent application is within UHF band that covers from 2300 MHz to 3000 Mhz.

In response to Applicant's arguments that "regarding claims 10 and 11, these claims call for the frequency controller being coupled to the local oscillator and the signal input for providing a frequency control signal to the local oscillator that always sets the frequency of the local oscillator to a frequency that differs from the frequency of the desired signal by the intermediate frequency and is within the predetermined frequency range. Nothing in the reference remotely discloses this limitation nor the desirability of modifying what is there disclosed to meet this limitation". Contrary to Applicant's arguments, In column 6 lines 1-25, see also figure 2, detecting means in the form of a center frequency detector 30 is coupled to an FM audio detector 20 and is responsive to a DC signal component developed by detector 20 for developing a control signal. Switching means in the form of switching circuit 23 is coupled to scanning circuitry 40 and is responsive to the gating signal from center frequency detector 30 for stopping the scanning only when the control signal has a value corresponding to the receiver being tuned to the center frequency of a desired signal (a selected station or channel). Scanner circuitry 40 causes the local oscillator 17 to tune the receiver to a desired frequency. In view of the foregoing disclosure, a person of ordinary skill in the art would have recognized that detecting means, switching means, and scanning means form a frequency controller as claimed in the patent application. The cited prior art elements perform the identical function specified in the claim in substantially the same way, and produce substantially the same results as the corresponding frequency controller disclosed in the specification. The equivalent frequency controller as taught in Imazeki invention is coupled to local oscillator 17 and potentiometers 35 36 which is a pre-selected voltage output representative of center frequency of a desired signal (a selected station or channel).

Furthermore, the equivalent frequency controller always sets the frequency of the local oscillator 17 to a frequency that differs from the center frequency of a desired signal (a selected station or channel) by an IF frequency and is within the predetermined range of frequencies as appreciated by one of ordinary skill in the art.

In response to Application's arguments that "as to the additional grounds for rejecting claim 12, claim 12 is dependant upon and includes all the limitation of claim 11 so that further discussion is submitted to be unnecessary□', the rejection from last Office action is recited in the following: "in column 5 lines 19-48, Imazeki discloses the scanner receiver embodiment in figure 2 including variable tuning means to selectively and sequentially tune the receiver to the predetermined frequencies and produce a corresponding IF signal. Imazeki discusses that several known techniques for implementing variable tuning means including programmable frequency synthesizer circuits for the local oscillator to tune the receiver to the desired frequencies. Imazeki discloses in the background of the invention that a synthesized frequency generating circuit sometimes takes the form of a phase-locked loop circuitry. Hence, one of ordinary skill in the art will appreciate that a phase-locked loop could be implemented in the local oscillator as claimed in the patent application".

In response to Applicant's arguments that "as to the rejection of claim 13, the reference fails to disclose a frequency controller coupled to the local oscillator and the signal path for providing a frequency control signal to the local oscillator that always sets the frequency of the local oscillator to a frequency that differs from that of a received signal within the predetermined frequency range by the intermediate frequency and is within the predetermined frequency range, nor does the reference suggest the desirability of modifying what is there disclosed to meet these limitations. Nor does the reference disclose modifying what is there disclosed to choose the predetermined frequency range as between 2440MHz to 2485MHz", claim 13 is rejected on the same ground as for claims 10-11 because of similar scope. Furthermore, Imazeki expresses the teachings apply to frequency ranges including VHF and UHF (see column 3, lines 25-30), both ranges cover from 30 MHz to 3000 MHz. The range of frequencies as claimed in the patent application is within UHF band that covers from 2300 MHz to 3000 Mhz. Pp.2-13.

II. CLAIMS 2, 3, 14 AND 15 MEET THE CONDITIONS FOR PATENTABILITY UNDER SECTION 103 AT LEAST BECAUSE THE IMAI PATENT FAILS TO DISCLOSE COMPARING THE FREQUENCY OF THE DESIRED RECEIVED SIGNAL TO A NONEXISTENT THRESHOLD FREQUENCY AND TUNING THE OSCILLATOR OF THE RECEIVER TO A FREQUENCY WITHIN THE RANGE OF RECEPTION FREQUENCIES BASED ON THE THRESHOLD FREQUENCY THAT IS LESS AND MORE THAN THE RECEIVED FREQUENCY WHEN THE RECEIVED FREQUENCY IS ABOVE AND BELOW THE THRESHOLD FREQUENCY, RESPECTIVELY, AND NOTHING IN THE REFERENCE SUGGESTS THE DESIRABILITY OF MODIFYING WHAT IS DISCLOSED IN THIS PATENT TO MEET THE LIMITATIONS OF REJECTED CLAIMS 2, 3, 14 AND 15.

The final action states:

Claims 2-3 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imai et al. U.S. Patent 4, 959, 872.

Regarding claim 2, in column 6 line 61 through column 7 line 60, figure 4 illustrates an embodiment of a super high frequency (SHF) band FM receiver in Imai et al. invention. FM receiver includes an input terminal 10a for receiving a first IF signal, a FM demodulator 40 supplying demodulation output to a second low pass filter (LPF) 42.

Output of LPF 42 is representative of demodulation error voltage Vde, which is converted to a digital data value Dde through a 1st level shifter 66 and a first A/D converter 68. A reference voltage source 46a, corresponding to a center frequency of the second IF signal, is provided and is converted to a digital data value Dref through a 2nd level shifter 70 and a second ND converter 72. Imai et al. does not expressly disclose the step of comparing the frequency of the desired received signal to a threshold frequency as claimed in the patent application. Nevertheless, Imai et al. further discloses that the 1st level shifter 66' and the 2nd level shifter 70 match the demodulation error voltage Vde to the reference voltage Vref. A microcomputer 48 calculates a demodulation sensibility Sd based on the digital data value Dde and the digital data value Dref, and generates an automatic fine-tuning (AFT) data signal based on the result of the calculation to control the second local oscillator 24 to set a reception of the desired channel in the FM receiver. From the aforementioned teachings, one of ordinary skill in the art will appreciate that the 1st level shifter 66 and the 2nd level shifter 70 performs the comparison step as claimed in the patent application. Also, it would have been obvious for one of ordinary skill in the art at the time the invention was made that the microcomputer 48 supplies a channel tuning data to tune the second oscillator 24 to a frequency of the desired channel based on the comparison step of Dde and Dref.

Imai et al. does not expressly disclose the step of converting the desired received signal frequency to an index value as claimed in the patent application. However, one of ordinary skill in the art would appreciate that the process of converting the demodulation error voltage Vde into a digital data value Dde would be equivalent to converting the desired received signal frequency to an index value since the converted digital data value is representative of the desired received signal frequency and the digital data value of reference voltage Vref is representative of center frequency of desired channel frequency. The SHF band carries a set of channels, hence, the received digital data value Dde would represent one of channels in the SHF band.

Regarding claim 3, claims 2-3 have similar scope, hence, the same rejection argument of claim 2 applies here. Imai et al. does not expressly disclose the step of representing the threshold frequency as an index value as claimed in the patent application. However, one of ordinary skill in the art would appreciate that converting the voltage reference Vde, corresponding to the center frequency of a desired channel frequency, into a digital data value Dref would be equivalent

to representing the threshold frequency as an index value. Since the SHF band carries a set of channels, a voltage reference Vde could be set to represent a center frequency of each channel in the SHF band.

Regarding claim 14, claims 2 and 14 have similar scope, hence, the same rejection argument of claim 2 applies here. As shown in figure 4, the SHF band FM tuner 42 in figure 4 includes an input terminal 10a, a local oscillator 24, a mixer 22, and a FM demodulator. The input terminal 10a, mixer 22, and a FM demodulator constitute a signal path as claimed in the patent application. One of ordinary skill in the art would appreciate that the components 2nd LPF 42, 1st level shifter, 1st A/D converter 68, reference voltage source 46a, 2nd level shifter 70, 2nd A/D converter, microcomputer 48 form the frequency controller as claimed in the patent application and those components are coupled between signal path and 2nd local oscillator. With the foregoing reasoning, microcomputer 48 corresponds to the microprocessor as claimed in the patent application.

Regarding claim 15, Imai et al. does not expressly disclose the microprocessor causes the frequency controller to add frequency offset values as claimed in the patent application. Nevertheless, Imai et al. teaches in column 7 lines 16-24 that the microcomputer 48 calculates a demodulation sensibility Sd based on digital signals Dde, corresponding to a received frequency, and Dref, corresponding to a reference voltage representative of a center frequency of a desired channel. The microcomputer 48 generates an automatic frequency tuning (AFT) data signal Daft based on the result of the calculation to control the second local oscillator 24. From the foregoing teachings, one of ordinary skill in the art would appreciate that the microcomputer 48 would generate a Daft to add a frequency offset if Dde is less than a Dref and subtract a frequency offset if Dde is more than a Dref. Pg. 23-26.

These grounds of rejections are respectively traversed.

Like Imazeki, Imai fails to disclose comparing the frequency of the desired received signal to a nonexistent threshold frequency and tuning the oscillator of the receiver to a frequency within the range of reception frequencies based on the threshold frequency, that is less and more than the received frequency when the received frequency is above and below the threshold frequency, respectively, as called for by claims 2 and 3 nor modifying what is there disclosed to meet these limitations of these claims. Nor does the reference disclose the frequency controller coupled to the local oscillator and the signal path for providing a frequency control signal to the local oscillator that always sets the frequency of the local oscillator to a frequency that differs from that of a received signal within the predetermined frequency range by the intermediate frequency and is within the predetermined frequency range as called for by

claims 14 and 15, nor suggest the desirability of modifying what is there disclosed to meet the limitations of these claims.

What the Examiner is doing is using the claims being rejected as a template or blueprint for attempting to read the claims on the prior art. This practice is not permitted.

> Here, the Examiner relied upon hindsight to arrive at the determination of obviousness. It is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious. [15] This court has previously stated that "[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention."[16] *In re Fritsch*, 23 U.S.P.Q. 2d 1780, 1784 (Fed. Cir. 1992).

If this ground of rejection were repeated, the Examiner was respectfully requested to quote verbatim the language in the reference regarded as corresponding to each limitation in each of these rejected claims, and quote verbatim the language in this reference regarded as suggesting the desirability of modifying what is there disclosed to meet limitations in these claims not present in the reference. The Examiner did not and cannot comply with this request. Instead the final action states:

> In response to Applicant's argument that "like Imazeki, lmai fails to disclose comparing the frequency of the desired.received signal to a nonexistent threshold frequency and tuning the oscillator of the receiver to a frequency within the range of reception frequencies based on the threshold frequency, that is less and more than the received frequency when the received frequency is above and below the threshold frequency, respectively as called for by claims 2 and 3 nor modifying what is there disclosed to meet these limitations of these claims. Nor does the reference disclose the frequency controller coupled to the local oscillator and the signal path for providing a control signal to the local oscillator that always sets the frequency of the local oscillator to a frequency that differs from that of a received signal within the predetermined frequency range by the intermediate frequency and is within the predetermined frequency range as called for by claims 14 and 15, nor suggest the desirability of modifying what is there disclosed to meet the /imitations of these claims. Accordingly, withdrawal of the rejection of claims 2, 3, 14 and 15 as unpatentable over lmai is respectfully requested. If this ground of rejection is repeated, the Examiner is respectfully requested to quote

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[15] 15 *In re Gorman*, 933 F.2d 982, 987, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991). See also *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed. Cir. 1985).

[16] *In re Fine*, 837 F.2d at 1075, 5 USPQ2d at 1600.

verbatim the language in the reference regarded as corresponding to each limitation in each of these rejected claims, and quote verbatim the language in this reference regarded as suggesting the desirability of modifying what is there disclosed to meet limitation in these claims not present in the reference", referring to Imai et. invention, Imai et. teachings are similar to Imazeki teachings. Imai et. invention is directed to an automatic frequency control apparatus for tuning an FM receiver to a center frequency of a received signal, which is a selected band. As recited in last Office action; in column 6 line 61 through column 7 line 60; figure 4 illustrates an embodiment of a super high frequency (SHF) band FM receiver in Imai et al. invention. FM receiver includes an input terminal 10a for receiving a first IF signal, a FM demodulator 40 supplying demodulation output to a second low pass filter (LPF) 42.

Output of LPF 42 is representative of demodulation error voltage Vde, which is converted to a digital data value. Dde through a 1st level shifter 66 and a first AID converter 68.'A reference voltage source 46a, corresponding to a center

frequency of the second IF signal, is provided and is converted to a digital data value Dref through a 2nd level shifter 70 and a second ND converter 72. Imai et al. does not expressly disclose the step of comparing the frequency of the desired received signal to a threshold frequency as claimed in the patent application. Nevertheless, Imai et al. further teaches that the 1st level shifter 66 and the 2"d level shifter 70 match the demodulation error voltage Vde to the reference voltage Vref; see column 7, lines 10-15. A microcomputer 48 calculates a demodulation sensibility Sd based on the digital data value Dde and the digital data value Dref, and generates an automatic fine-tuning (AFT) data signal based on the result of the calculation to control the second local oscillator 24 to set a reception of the desired channel in the FM receiver. From the aforementioned teachings, the act of matching the 1st level shifter 66 and the 2"d level shifter 70 performs the function of the comparison step specified in the application claim. Because demodulation error voltage Vde is matched to the reference voltage Vref, which corresponds to the center frequency of a received signal (selected band) and the result is used to generate a control signal to control local oscillator 24, the prior art element performs identical function specified in the claim in substantially the same way, and produces substantially the same results as the corresponding steps of "comparing the frequency of the desired received signal to a threshold" and "tuning the oscillator of the receiver to a frequency within the range of frequency ...". The reference voltage Vref corresponds to the claimed threshold frequency and the demodulation error voltage Vde is representative of a demodulation error of the received signal. Further teachings disclose the microcomputer 48 supplies a channel tuning data to tune the second oscillator 24 to a frequency of the desired channel based on the comparison step of Dde and Dref; see column 7, lines 15-25. Claims 3, 14-15 are rejected for the same reasons as stated in last Office action. Pp. 13-15.

CONCLUSION

In view of the forgoing authorities, reasoning, and inability of the prior art to suggest the desirability of modifying what is there disclosed to meet the terms of the rejected claims, the decision of the Examiner should be reversed. Should the Board be of the opinion that a claim on appeal may be amended to overcome a specific rejection, the Board is respectfully requested to include in the opinion such a statement and afford appellant the right to amend in conformity therewith.

The brief fee of $500 is enclosed. Please apply any other charges or credits to Deposit Account No. 06 1050, Order No. 02103-349001. .

Respectfully submitted,
FISH & RICHARDSON P.C.

Date: MAY 24 2005

Charles Hieken
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Reg. No. 18,411
Attorneys for Application Owner

Encl: Previously Submitted Formal Drawings (six (6) sheets)

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20983260.doc

(vii). CLAIMS APPENDIX

1. A method of tuning an oscillator of a receiver, comprising:

receiving an electromagnetic signal having a frequency within a predetermined range of reception frequencies;

comparing the frequency of the desired received signal to a threshold frequency;

tuning the oscillator of the receiver to a frequency within the range of reception frequencies based on the threshold frequency, that is less and more than the received frequency when the received frequency is above and below the threshold frequency, respectively.

2. A method of tuning an oscillator of a receiver, comprising:

receiving an electromagnetic signal having a frequency within a predetermined range of reception frequencies;

comparing the frequency of the desired received signal to a threshold frequency;

tuning the oscillator of the receiver to a frequency within the range of reception frequencies based on the threshold frequency, that is less and more than the received frequency when the received frequency is above and below the threshold frequency, respectively,

further comprising converting the desired received signal frequency to an index value of a set of index values, the set of index values corresponding to a set of channels in said predetermined range of reception frequencies.

3. A method of tuning an oscillator of a receiver, comprising:

receiving an electromagnetic signal having a frequency within a predetermined range of reception frequencies;

comparing the frequency of the desired received signal to a threshold frequency;

tuning the oscillator of the receiver to a frequency within the range of reception frequencies based on the threshold frequency, that is less and more than the received frequency when the received frequency is above and below the threshold frequency, respectively,

further comprising representing the threshold frequency as an index value of a set of index values, the set of index values uniquely corresponding to a set of channels in said predetermined range of reception frequencies.

4. The method of claim 1 wherein tuning the oscillator further comprises applying one of at least two frequency offsets to the received frequency that is added when the received frequency is greater than and less than the threshold frequency, respectively.

5. The method of claim 4 wherein the first and second offsets have the same magnitude.

6. The method of claim 5 wherein the range of frequencies is bounded by high and low frequencies F_{HIGH} and F_{LOW}, respectively, the first and second offsets being less than or equal to $(F_{HIGH} - F_{LOW})/2$.

7. The method of claim 5 wherein the first and second frequency offsets are equal to an intermediate frequency of the receiver.

8. A method of tuning an oscillator of a receiver, comprising:

receiving an electromagnetic signal having a frequency within a predetermined range of reception frequencies;

comparing the frequency of the desired received signal to a threshold frequency;

tuning the oscillator of the receiver to a frequency within the range of reception frequencies based on the threshold frequency, that is less and more than the received frequency when the received frequency is above and below the threshold frequency, respectively,

wherein the range of frequencies is bounded by high and low frequencies F_{HIGH} and F_{LOW}, respectively, the threshold frequency approximately equalling $F_{LOW} + (F_{HIGH} - F_{LOW})/2$.

9. A method of tuning an oscillator of a receiver, comprising:

receiving an electromagnetic signal having a frequency within a predetermined range of reception frequencies;

comparing the frequency of the desired received signal to a threshold frequency;

tuning the oscillator of the receiver to a frequency within the range of reception frequencies based on the threshold frequency, that is less and more than the received frequency when the received frequency is above and below the threshold frequency, respectively,

wherein the range of frequencies is 2400 MHz to 2485 MHz inclusive.

10. An electromagnetic signal receiver constructed and arranged to receive signals within a predetermined frequency range and having a predetermined intermediate frequency comprising:

a local oscillator,

a source of a signal representative of the frequency of a desired signal to be received within said predetermined frequency range,

and a frequency controller coupled to said local oscillator and said source of a signal for providing a frequency control signal to said local oscillator that always sets the frequency of said local oscillator to a frequency that differs from the frequency of said desired signal by said intermediate frequency and is within said predetermined frequency range.

11. A receiver comprising:

a signal path for conducting a received electrical signal of reception frequency within a predetermined range of frequencies;

a local oscillator for providing a local oscillator signal,

and a frequency controller coupled to said local oscillator and said signal path for providing a frequency control signal to said local oscillator that always sets the frequency of said local oscillator to a frequency that differs from that of a received signal within said predetermined frequency range by said intermediate frequency and is within said predetermined frequency range,

a local oscillator, for providing a local oscillator signal;

a mixer coupled to said local oscillator and said signal path for providing an intermediate frequency signal of predetermined intermediate frequency.

12. The receiver of claim 11 wherein the local oscillator further comprises a phase-locked loop.

13. A receiver, comprising:

a signal path for conducting a received electrical signal of reception frequency within a predetermined range of frequencies;

a local oscillator, for providing a local oscillator signal;

and a frequency controller coupled to said local oscillator and said signal path for providing a frequency control signal to said local oscillator that always sets the frequency of said local oscillator to a frequency that differs from that of a received signal within said predetermined frequency range by said intermediate frequency and is within said predetermined frequency range.

a mixer coupled to said local oscillator and said signal path for providing an intermediate frequency,

wherein the predetermined frequency range is 2440 MHz to 2485 Mhz inclusive.

14. A receiver, comprising:

a signal path for conducting a received electrical signal of reception frequency within a predetermined range of frequencies;

a local oscillator, for providing a local oscillator signal;

and a frequency controller coupled to said local oscillator and said signal path for providing a frequency control signal to said local oscillator that always sets the frequency of said local oscillator to a frequency that differs from that of a received signal within said predetermined frequency range by said intermediate frequency and is within said predetermined frequency range,

a mixer coupled to said local oscillator and said signal path for providing an intermediate frequency,

wherein the frequency controller further comprises a microprocessor.

15. The receiver of claim 14 wherein the microprocessor comprises a computer readable medium containing instructions capable of causing the frequency controller to:

add a first frequency offset value when the received frequency is greater than a predetermined threshold frequency within said predetermined frequency range; and

add a second frequency offset value of magnitude to the local oscillator frequency corresponding to said intermediate frequency when the received frequency is less than said threshold frequency.

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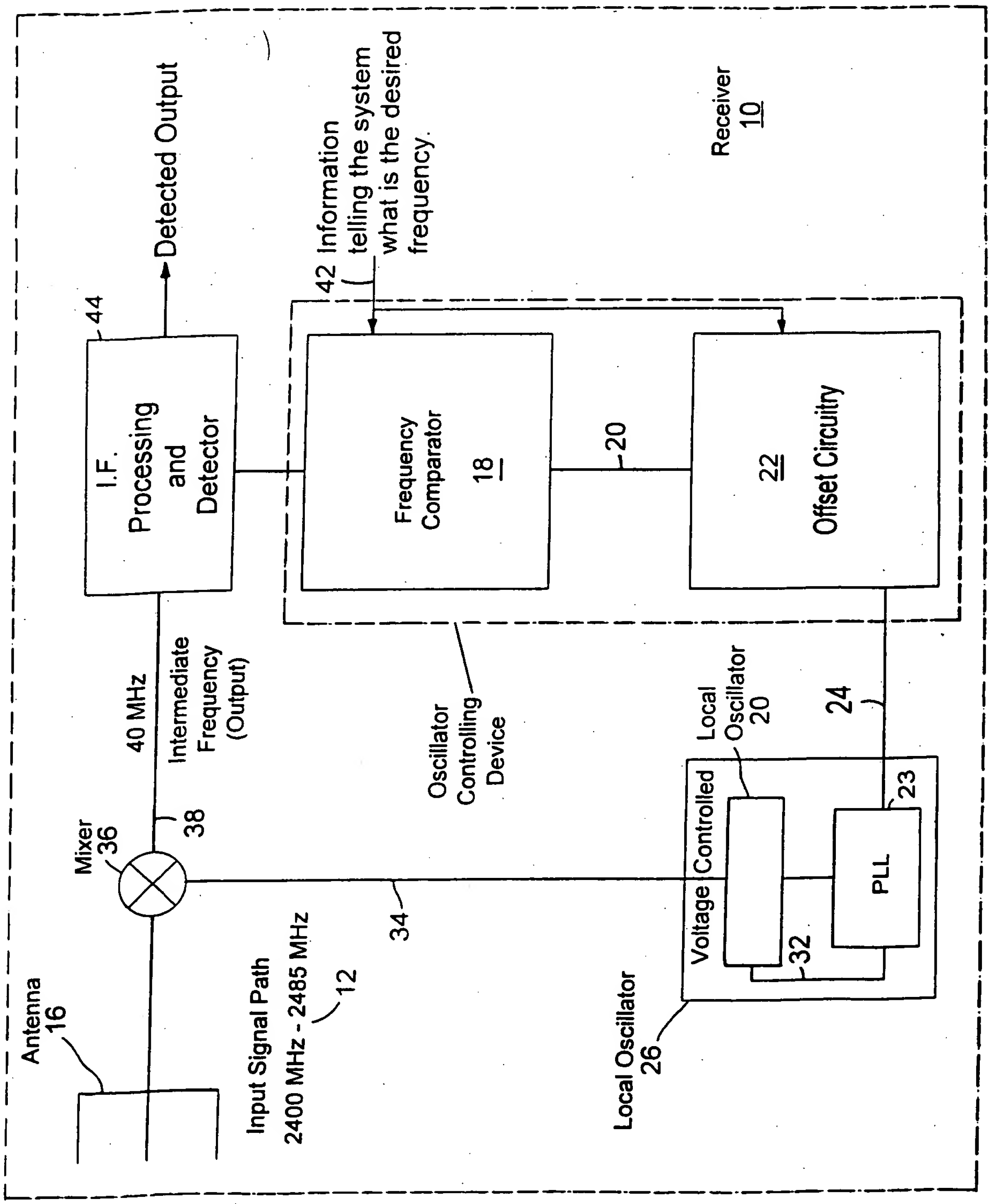
Receiver
10
Antenna
16
Input Signal Path
2400 MHz - 2485 MHz
12
Mixer
36
38
40 MHz
Intermediate
Frequency
(Output)
I.F.
Processing
and
Detector
44
Detected Output
42 Information
telling the system
what is the desired
frequency.
Frequency
Comparator
18
20
22
Offset Circuitry
Oscillator
Controlling
Device
34
24
Local
Oscillator
20
Voltage Controlled
PLL
23
32
Local Oscillator
26

FIG. 1

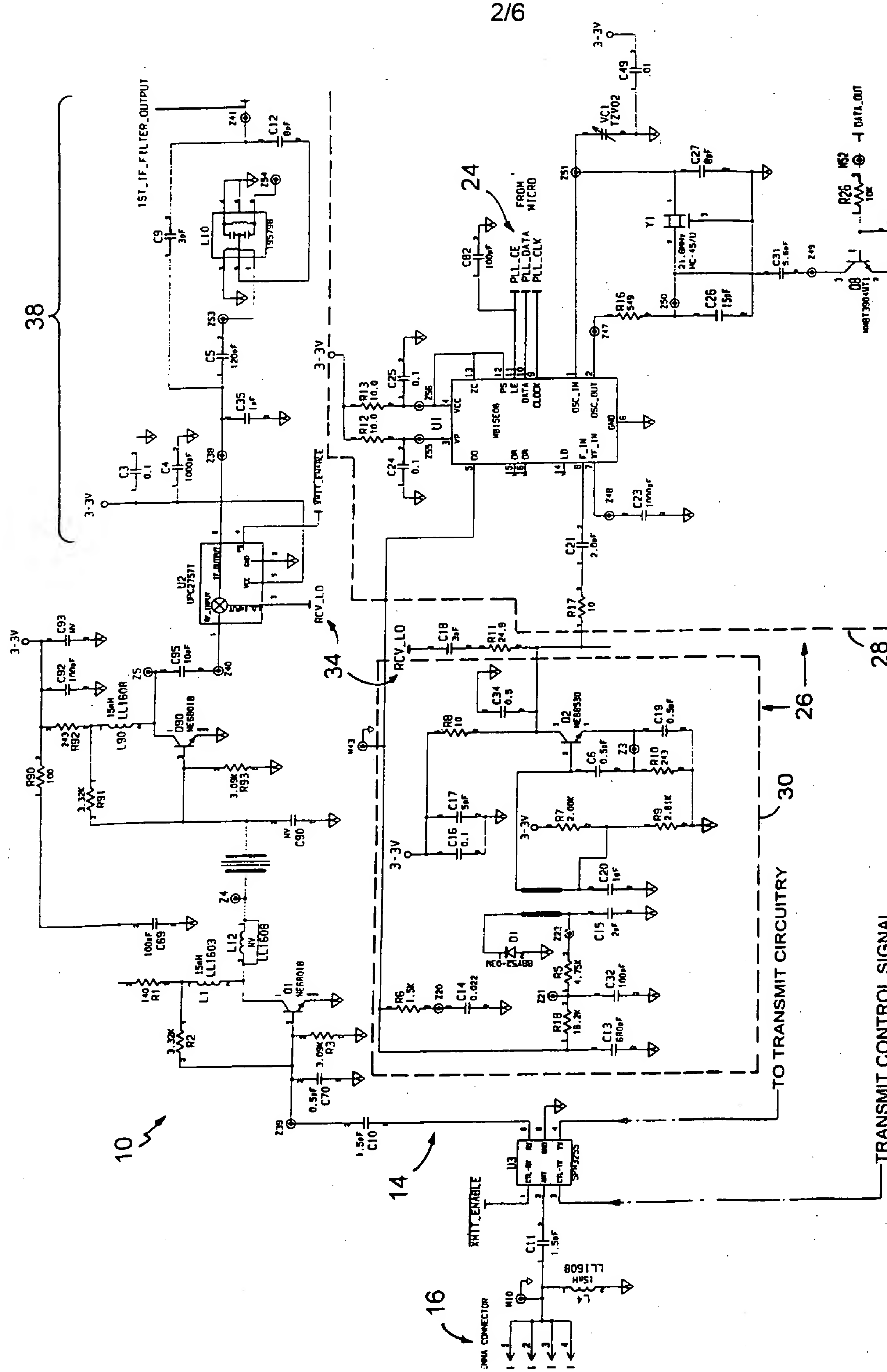
1ST_IF_FILTER_OUTPUT
38
24
FROM MICRO
PLL_CE
PLL_DATA
PLL_CLK
MB15E06
U1
U2
UPC2757T
U3
RCV_LO
XMIT_ENABLE
DATA_OUT
34
26
28
30
10
14
16
TO TRANSMIT CIRCUITRY
TRANSMIT CONTROL SIGNAL

FIG. 2A

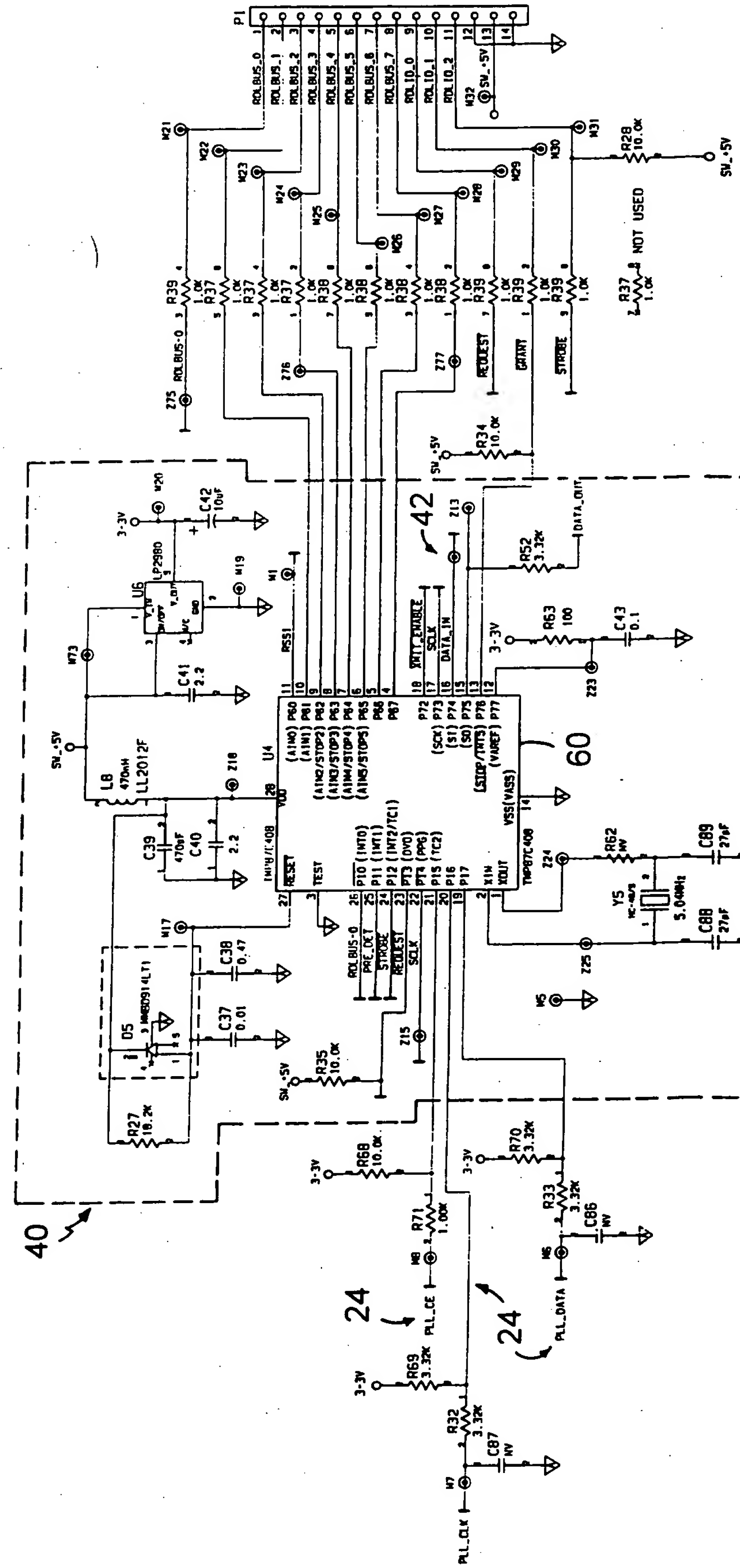
P1
RDLBUS_0
RDLBUS_1
RDLBUS_2
RDLBUS_3
RDLBUS_4
RDLBUS_5
RDLBUS_6
RDLBUS_7
RDLIO_0
RDLIO_1
RDLIO_2
SW_+5V
NOT USED
REQUEST
GRANT
STROBE
U4
U6
LP2980
LL2012F
TMP87C408
DATA_OUT
XMIT_ENABLE
SCLK
DATA_IN
PRE_DET
PLL_CE
PLL_DATA
PLL_CLK
5.040MHz
42
60
40
24
24

FIG. 2B

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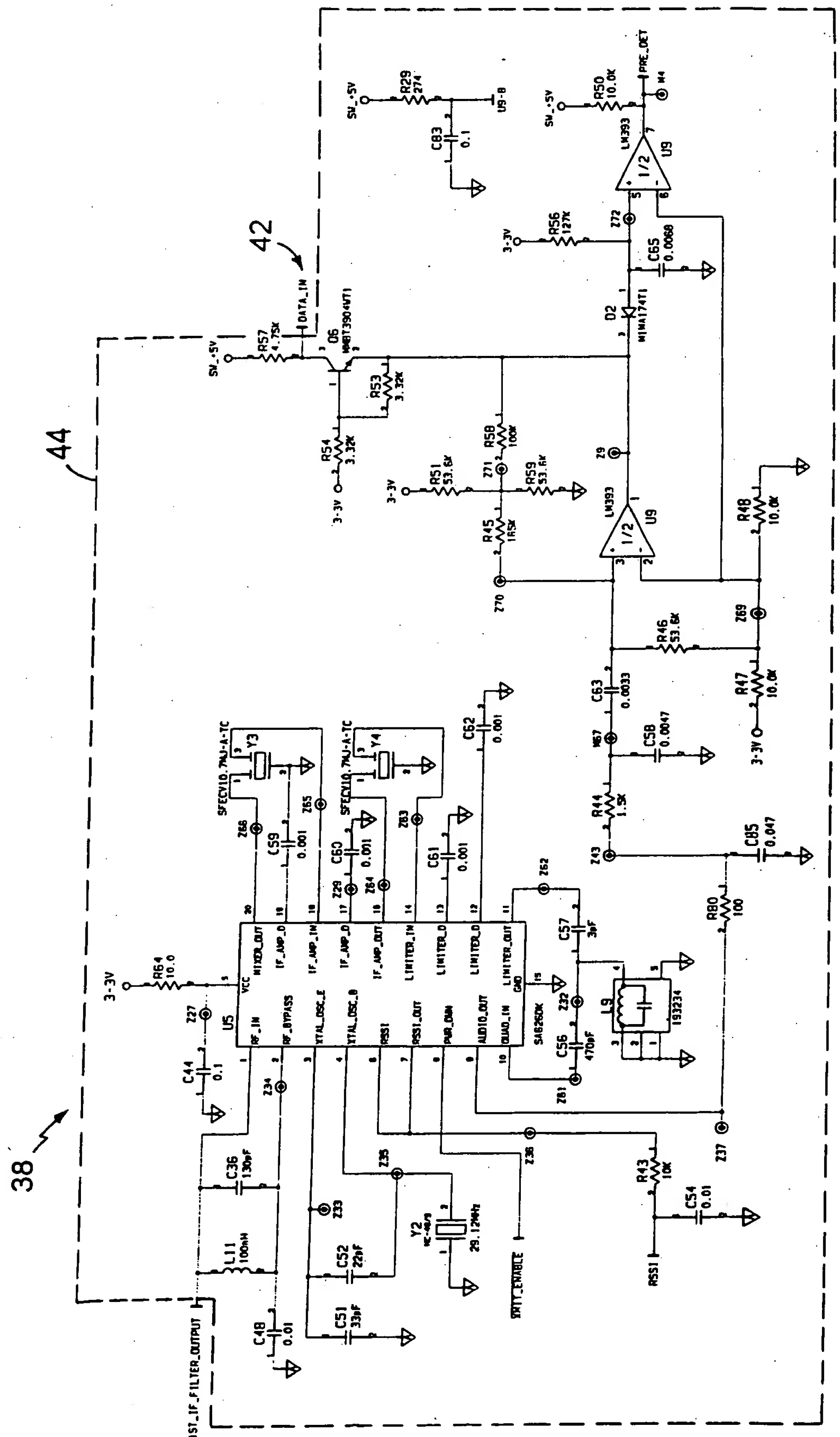

FIG. 2C

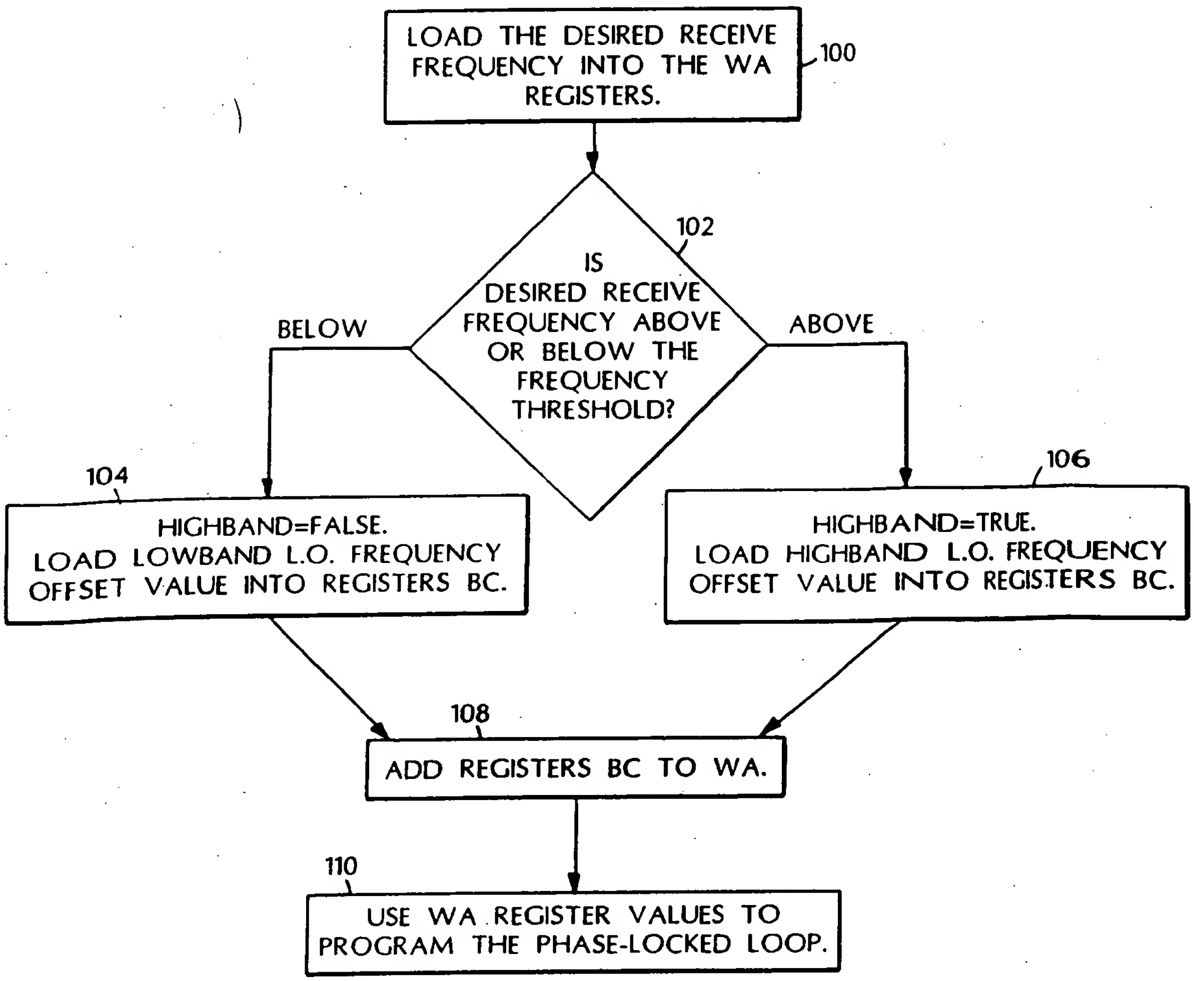
LOAD THE DESIRED RECEIVE FREQUENCY INTO THE WA REGISTERS.
100
102
IS DESIRED RECEIVE FREQUENCY ABOVE OR BELOW THE FREQUENCY THRESHOLD?
BELOW
ABOVE
104
HIGHBAND=FALSE. LOAD LOWBAND L.O. FREQUENCY OFFSET VALUE INTO REGISTERS BC.
106
HIGHBAND=TRUE. LOAD HIGHBAND L.O. FREQUENCY OFFSET VALUE INTO REGISTERS BC.
108
ADD REGISTERS BC TO WA.
110
USE WA REGISTER VALUES TO PROGRAM THE PHASE-LOCKED LOOP.

FIG. 3

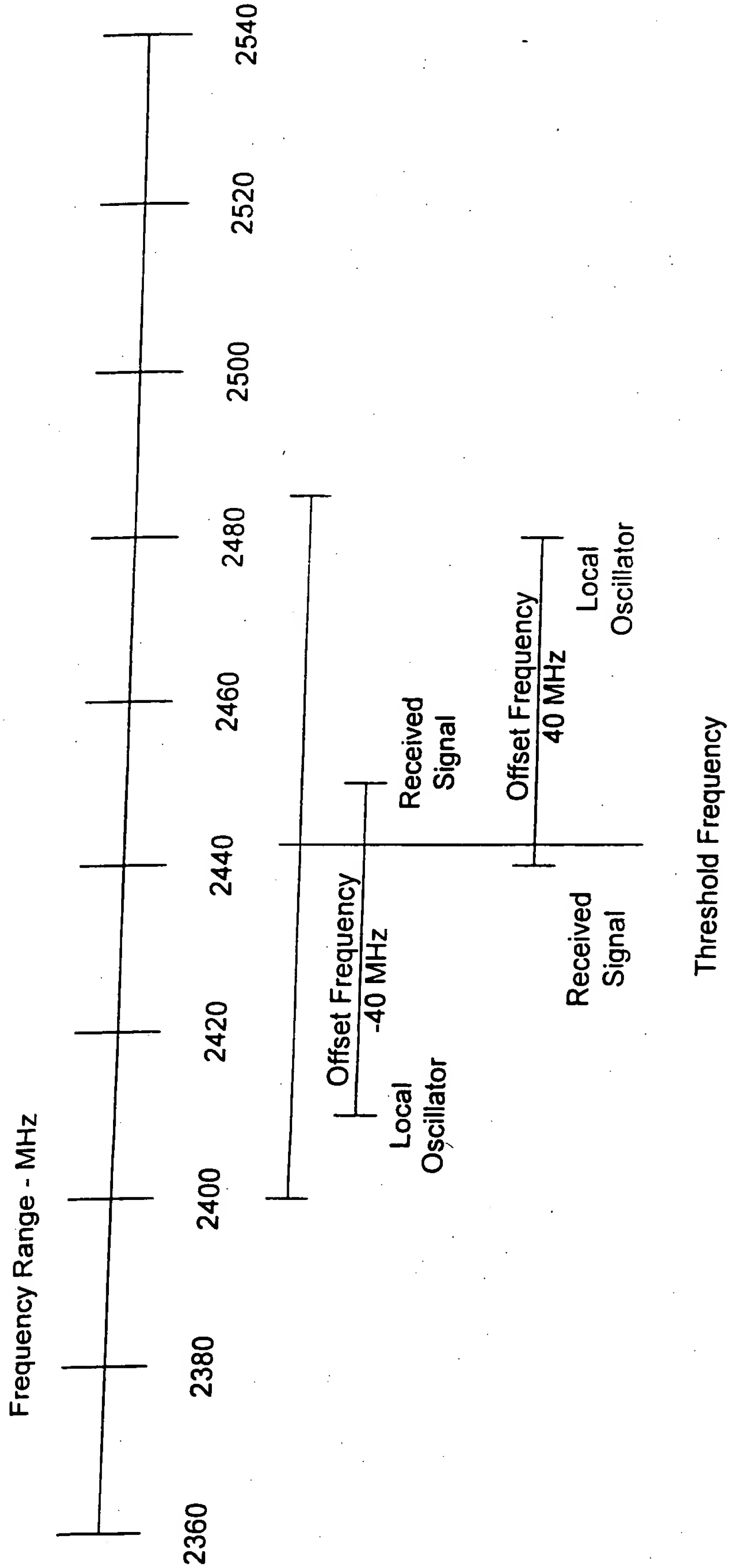
Frequency Range - MHz
2360
2380
2400
2420
2440
2460
2480
2500
2520
2540
Local Oscillator
Offset Frequency -40 MHz
Received Signal
Received Signal
Offset Frequency 40 MHz
Local Oscillator
Threshold Frequency

FIG. 4